

PIKAYEVA, V.L.; EMANUEL*, N.M. (Moskva)

Kinetics and mechanism of oxidation of diphenylethane in the
liquid phase. Zhur. fiz. khim. 35 no. 4:812-820 Ap '61.
(MIRA 14:5)

1. Akademiya nauk SSSR, Institut khimicheskoy fiziki.
(Bibenzyl)

BLYUMBERG, E.A.; MALIYEVSKIY, A.D.; EMANUEL', N.M.

Critical phenomena observed during the liquid phase oxidation of
butane in benzene. Dokl.AN SSSR 136 no.5:1130-1132 F '61.
(MIRA 14:5)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Butane) (Oxidation)

BLYUMBERG, E.A.; ZAIKOV, G.Ye.; EMANUEL', N.M.

Oxidation of n-butane in the gaseous and liquid phases. Dokl.
AN SSSR 139 no.1:99-101 J1 '61. (MIRA 14:7)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Butene) (Oxidation).

S/020/61/140/001/012/024
B127/B101

AUTHORS: Gagarina, A. B., Mayzus, Z. K., and Emanuel', N. M. ,
Corresponding Member AS USSR

TITLE: Critical phenomena in hydrocarbon oxidation in the presence
of inhibitors in open systems

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 1, 1961, 153 - 156

TEXT: The authors referred to N. N. Semenov (O nekotorykh problemakh khimicheskoy kinetiki i reaktsionnoy sposobnosti - Some problems of chemical kinetics and reactivity, Izd. AN SSSR, 1958, p. 632) who showed that a critical concentration of inhibitors affects the oxidation process considerably. At a concentration lower than the critical one, the process is selfaccelerated, while at a higher concentration it becomes steady. The mathematical analysis was carried out by V. M. Andreyev. In this paper, the authors published the experimental studies. Their method is described in Ref. 5: Ye. T. Denisov, Z. K. Mayzus, I. P. Skibida, N. M. Emanuel', DAN, 128, 755 (1959). The oxidation was conducted by bubbling oxygen at 135°C through a mixture of n-decane with an inhibitor (α -naphthol). The process was checked by iodometric titration of the
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S/020/61/140/001/015/024
B127/B101

Critical phenomena in...

peroxides obtained. When the inhibitor concentration changes from $9 \cdot 10^{-9}$ to $9.05 \cdot 10^{-9}$ mole/ml, the steady hydroperoxide concentration drops sharply, practically to zero. The authors show that the critical inhibitor concentration depends on the peroxide concentration. The following

reactions constitute the total oxidation: $RH + O_2 \xrightarrow{\omega_0} R^{\cdot}$, chain formation.

Chain lengthening: $R^{\cdot} + O_2 \xrightarrow{k_1} RO_2^{\cdot}$ and $RO_2^{\cdot} + RH \xrightarrow{k_2} ROOH + R^{\cdot}$. Cleavage:

$ROOH \xrightarrow{k_3} RO^{\cdot} + OH^{\cdot}$. Chain rupture: $RO_2^{\cdot} + RO_2^{\cdot} \xrightarrow{k_4}$ and $RO_2^{\cdot} + InH \xrightarrow{k_i} ROOH + In^{\cdot}$

(In = inhibitor). According to V. M. Andreyev who obtained

$$[InH]_{np} = 2 \sqrt{\frac{2\omega_0 k_3 \omega_0}{k_p(k_3 + v)} + \frac{2\omega_0 k_3}{k_i(k_3 + v)} + \frac{\omega_0}{v}}, \quad (A)$$

for the critical inhibitor concentration and

$$\frac{k_i}{k_3} = \frac{2[RH] k_3}{k_3 + v} \frac{1}{(\sqrt{[InH]_{np}} - \sqrt{\omega_0/v})^2}. \quad (B)$$

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Critical phenomena in...

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($K_p = cr$) for the ratio. The authors determined the ratio k_1/k_2 for α -naphthol as an inhibitor, using the experimentally determined constant: $[InH]_{cr} = 9 \cdot 10^{-9}$ mole/ml, and the following constants: $v = 0.5 \text{ hr}^{-1}$, $[RH] = 5.2 \cdot 10^{-3}$ mole/ml, $\omega_0 = 1.8 \cdot 10^{-9}$ mole/ml. It was found that $k_1/k_2 = 1.33 \cdot 10^5$. The activation energy of the reaction of RO_2^\cdot with n-decane equals 15.1 kcal/mole, and that of the reaction of RO_2^\cdot with α -naphthol equals 5.4 kcal/mole. v is determined by W/V . W is the volume of the substance entering the reaction vessel per unit time, and V is the volume of the reaction mixture. There are 3 figures and 7 Soviet references.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: May 20, 1961

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2867h

S/020/61/140/002/019/023
B130/B110

5.4300

AUTHORS: Zaikov, G. I., Mayzus, Z. K., and Emanuel, N. M., Corresponding Member AS USSR

TITLE: Mechanism of chain ramifications during oxidation of methyl ethyl ketone in liquid phase

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 2, 1961, 405-408

TEXT: The authors found that the degenerate chain ramification during oxidation of methyl ethyl ketone (I) in liquid phase proceeds through the decomposition into radicals of two intermediate compounds, keto hydroperoxide and diacetyl. (I) was oxidized with atmospheric oxygen in an autoclave at 50 atm and 100-145°C. The oxidation products (acetic acid, ethyl acetate, diacetyl, ethanol, peroxides, CO, and CO₂) were analyzed chemically or by paper chromatography. From the course of the kinetic curve for the (I) consumption (Fig. 1) it may be concluded that the oxidation is a reaction of the first order. In fact, a complicated process takes place, which is suggested by the chain reaction and the anomalously low factor before the exponential function in the equation for the constant

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S/020/61/140/002/019/023
B130/B110

Mechanism of chain ramifications ...

of the reaction rate, $k = 5.2 \cdot 10 \exp(11,200/RT) \text{ sec}^{-1}$. The chain character of the process was proven by addition of α -naphthol (II) as inhibitor. In the presence of (II), a noticeable induction period occurs, the duration of which rises with increasing inhibitor concentration. The rate of formation of chains during oxidation of (I) was determined from the kinetics of inhibitor consumption: $\omega_0 = 1.5 \cdot 10^{-6} \text{ mole/liter-sec}$ at 145°C . During the process, the rate of initiation rises as compared with ω_0 due to the formation of degenerate ramifications. The rate of initiation during the reaction was determined by measuring the consumption of inhibitor (II) freshly supplied at different time intervals. Fig. 3 shows that the oxidation of (I) proceeds like a chain reaction. The rate of initiation, however, rises to double its value only. For the rate ω of oxidation of (I), it is written down: $\omega = (k_2/\sqrt{k_5})[RCOR_1]\omega_1^{1/2}$. An increase of the reaction rate ω to double its value changes the initiation rate $\omega_1^{1/2}$ by the 1.3-fold only, which leads to a linear dependence of the reaction rate on the concentration of (I), i.e., to a reaction of the first order. The rate of chain ramification during oxidation of (I) rises in proportion with the accumulating amount of keto hydroperoxide only at the

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Mechanism of chain ramifications ...

beginning of the reaction. Later on, a higher total rate of formation of radicals is observed than corresponds to the decomposition of keto hydroperoxide into free radicals. This shows that, besides keto hydroperoxide, other intermediates participate in the chain ramification during oxidation of (I). The assumption of a cooperation of diacetyl (formed in this reaction and readily decomposable into two radicals) was confirmed by an increasing rate of chain ramification on addition of diacetyl. The dependence of the ramification rate on the total concentration of keto hydroperoxide and diacetyl is calculated:

$$w_1 = k_1 [D]_1 + k_2 [P]_1 = k_1 \left\{ [D]_1 + \frac{k_2}{k_1} [P]_1 \right\} \quad (1).$$

Here, w_1 is the rate of initiation at a certain instant of the reaction; $[D]$ and $[P]$ are the concentrations of diacetyl and keto hydroperoxide. On admixture of an additional amount of diacetyl, Eq. (1) obtains the form:

$$w_1 = k_1 [D]_2 + k_2 [P]_1 = k_1 \left\{ [D]_2 + \frac{k_2}{k_1} [P]_1 \right\} \quad (2).$$

From (1) and (2), we obtain:

$$\omega_1/\omega_2 = \left\{ [D]_1 + (k_2/k_1) [P]_1 \right\} / \left\{ [D]_2 + (k_2/k_1) [P]_1 \right\} \cdot k_2/k_1 \text{ can easily be}$$

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Mechanism of chain ramifications ...

calculated since the other data are experimentally determined. The authors found for k_1 at 145°C : $1.0 \cdot 10^{-5} \text{ sec}^{-1}$, for k_2 : $1.4 \cdot 10^{-4} \text{ sec}^{-1}$. X

There are 4 figures and 14 references: 11 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: W. D. Emmons, G. B. Lucas, J. Am. Chem. Soc., 77, 2287 (1955); J. S. F. Pote, W. A. Waters, J. Chem. Soc., 1956, 717; W. A. Waters, J. Chem. Soc., 1946, 1151.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: May 20, 1961

Fig. 1. Kinetic curves for the consumption of methyl ethyl ketone and the accumulation of reaction products at $T = 145^\circ\text{C}$, pressure = 50 atm, and air velocity = 20 liters/hr. (1) Consumption of methyl ethyl ketone, (1') semi-logarithmic anamorphosis of curve 1, (2) accumulation of acetic acid, (3) CO_2 , (4) CO , (5) ethyl acetate, (6) diacetyl, (7) keto hydroperoxide (right-hand scale), (8) ethanol (right-hand scale).

Legend: (a) hr, (b) mole%.

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PHASE I BOOK EXPLOITATION

SOV/6319

Berezin, Il'ya Vasil'yevich, Yevgeniy Timofeyevich Denisov, and
Nikolay Markovich Emanuel;

Okisleniye tsiklogeksana (Oxidation of Cyclohexane) [Moscow]
Izd-vo Mosk. univ., 1962. 301 p. Errata slip inserted. 3500
copies printed.

Ed.: N. A. Korobtsova; Tech. Ed.: T. A. Kozlova.

PURPOSE: This book is intended for chemists and chemical engineers
engaged in the industrial oxidation of cyclohexane.

COVERAGE: The book discusses current theory and technology of
cyclohexane oxidation. Although the text is based primarily on
non-Soviet materials, the discussion of kinetics is taken entirely
from N. N. Semenov's theory of degenerate-branched chain reactions.
The oxidation of cyclohexane is presented in the broadest range,
e.g., from elementary reactions to the technological process.
References are given at the end of each chapter.

Card 1/4

EMANUEL, N.M.

SESSION A-5-3 : Free Radicals in Biological Systems

(a)
Free Radical States and Processes in Experimental Radiobiology and
Peculiarities of the Effect of Inhibitors of Reactions of Radicals

N. M. Emanuel

It was shown that low-toxicity inhibitors of radical chain processes (in particular the derivatives of gallic acid) reduce the radiation-induced decrease in relative viscosity of DNA solutions. Some compounds are not only protective but also have an effect when added after irradiation. The reduction in damage to DNA molecules in the presence of inhibitors is illustrated by electron microscope photographs.

It was found that inhibitors retard the development of oxidation processes in the lipids of the liver of irradiated animals. These processes were followed using infra-red spectra. Metastable states and energy levels of protein and of nucleic acids were analysed on the basis of spectra and of the kinetics of the decay of gamma and photophosphorescence. Indications of protein cross-linking were seen.

Differences were shown between the mechanisms of action of the inhibitors of radical processes and those of the widely known radioprotective agents of the mercamine type. A correlation was established in experiments *in vivo* between the magnitude of the inhibitory index of the compounds used (measured in chemical models) and the survival of irradiated animals.

Institute of Chemical Physics, Moscow, USSR

report presented at the 2nd Intl. Congress of Radiation Research,
Keele/Leamington, Oxf. Brit. 5-11 Aug 1962

BERZIN, Il'ya Vasil'yevich; DENISOV, Yevgeniy Timofeyevich;
EMANUEL', Nikolay Markovich; KOROBTSOVA, N.A., red.;
KOZLOVA, T.A., tekhn. red.

[Oxidation of cyclohexane] Okislenie tsiklogeksana. Moskva,
Izd-vo Mosk. univ. 1962. 301 p. (MIRA 16:1)
(Cyclohexane) (Oxidation)

EMANUEL', N.M.; KNORRE, A.G.; Primali uchastiye: GAGARINA, A.B.;
SKIBIDA, I.P.; ALAVERDOV, Ya.G., red.; IEZHOVA, L.L., tekhn.
red.

[Course in chemical kinetics; homogeneous reactions] Kurs khimicheskoi kinetiki; gomogennye reaktsii. Moskva, Gos.izd-vo
"Vysshaya shkola," 1962. 413 p. (MIRA 16:3)
(Chemical reaction, Rate of)

EMANUEL, N.M., BLYUMBERG, E.A.,

Fluid phase oxidation of low molecular organic compounds for monomer production.

Report presented at the 12th Conference on high molecular weight compounds devoted to monomers, 3-7 April 62

GOL'DBERG, V.M.; OBUKHOVA, L.K.; EMANUEL', N.M.

Certain features of the action of a potassium-manganese catalyst in the reaction of n-decane oxidation. Neftekhimiia 2 no.2:229-236
Mr-Apr '62. (MIRA 15:6)

1. Institut khimicheskoy fiziki AN SSSR.
(Decane) (Oxidation) (Catalysis)

.EMANUEL', N.M.

Problem of cancer in a physicochemical aspect. Nauka i
zhizn' 29 no.10:42-43 0 '62. (MIRA 15:12)

1. Chlen-korrespondent AN SSSR.
(BIOCHEMISTRY)
(CANCER RESEARCH)

EMANUEL, N.M.

34759

S/020/62/142/003/027/027
B144/B101

27/220
AUTHORS:

Nikolayeva, N. V., Kruglynkova, K. Ye., Kiselev, N. A.,
Baynshhteyn, B. K., and Emanuel, N. M., Corresponding
Member AS USSR

TITLE: Reduction of radiation damage of DNA molecules in the
presence of propyl gallate (PG)

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 3, 1962, 713-715

TEXT: The present study concerns the protective effect of PG on 0.007%
DNA solutions which were prepared from the spleen of rats and diluted in
0.1 M ammonium acetate, pH 6.2, to 0.0015%. The intrinsic viscosity $[\eta]$
of 25 dl/g corresponds to a molecular weight of $\sim 3 \cdot 10^6$, the coefficient
of molar extinction $\epsilon(\lambda)_{260 \text{ m}\mu} = 6450$. Doses of 66,000, 168,000, and
336,000 r were applied with a G4-2 (BF-2) short focus x-ray test apparatus
(8 ma, 75 kv, Mo anode, without filter), dose intensity 135,000 r/min.
One-stage carbon replicas were examined in an IEM-5G electron microscope,
accelerating tension 80 kv, magnification 18-25,000 times. The damage
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Reduction of radiation damage...

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B144/B101

percentage increases from 50 through 75 to 100% after irradiation doses in the above-mentioned sequence. In all cases, addition of PG guarantees a 40 - 50% protection of DNA molecules (Fig. 1). The size of the DNA molecule fragments is greater with PG addition than without. Further studies are needed to decide whether these fragments are incompletely decomposed molecules of the initial DNA or a result of cross-linking facilitated by PG. PG addition after irradiation and testing of DNA and PG as to their biological activities may solve this problem. There are 2 figures and 19 references: 8 Soviet and 11 non-Soviet. The four most recent references to English-language publications read as follows: A. R. Peacocke, B. N. Preston, *Proc. Roy. Soc., Ser. B*, 153, No. 950, 93 (1960); R. Latarjet, H. Ephrussi-Taylor, N. Rebeyrotte, *Radiation Res.*, Suppl. 1, 417 (1959); F. M. Defilippes, W. R. Guild, *Radiation Res.*, 11, 38, (1959); P. Alexander, K. A. Stacey, *IV Internat. Congress of Biochemistry, Vienna*, 1 - 6 Sept., Symp. IX, 1958.

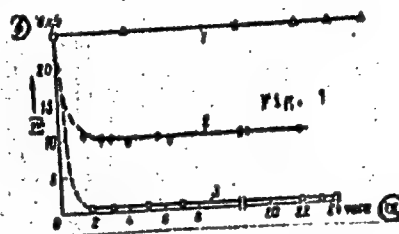
SUBMITTED: September 30, 1961

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3/020/62/142/003/027/027
B144/B101

Reduction of radiation damage...

Fig. 1. Change in intrinsic viscosity of DNA solutions before and after x-ray irradiation.
Legend: (1) control (before irradiation); (2) irradiation with PG addition; (3) irradiation without PG; (a) hours; (b) cl/g.



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S/020/62/143/002/016/022
B145/B138

AUTHORS: Mayzus, E. K., ~~Emanuel, N. Mr.~~, Corresponding Member A.S. USSR,
and Yakovleva, V. N.

TITLE: Mechanism of chain formation in n-decane oxidation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 2, 1962, 366 - 369

TEXT: The mechanism was experimentally investigated for liquid-phase
n-decane to find out whether the reaction concerned is trimolecular
($2 \text{ RH} + \text{O}_2 \rightarrow \text{R}^\bullet + \text{H}_2\text{O}_2 + \text{R}^\bullet - q_2$) or bimolecular ($\text{RH} + \text{O}_2 \rightarrow \text{R}^\bullet + \text{HO}_2^\bullet - q_1$).

The chain formation rate W_o was measured with α -naphthene as inhibitor,
whose concentration was measured by spectrophotometry after reaction
with p-nitrobenzodiazonium chloride to form an azo dye at 150°C . The
inhibitor consumption is linearly time-dependent up to a 30 - 40% conver-
sion. The rate of inhibitor consumption, W_{INH} , determined from the
foregoing, grows with the inhibitor concentration, i. e., the radical
formation rate is so low at the beginning of oxidation as to become

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comparable to the rate of inhibitor oxidation by O_2 . The resulting equation reads: $-d[InH]/dt = W_0 + k_i [InH]^n [O_2]$. W_{InH} is linearly dependent on $[InH]^2$ ($n=1.95$ was found from the straight line in the coordinates $d[InH]/dt, \log [InH]$). $W_0 = 2.6 \cdot 10^{-9}$ mole/liter·sec was determined from section cut off by the straight-line on the ordinate of the $W_{InH} - [InH]^2$ diagram, and $k_i = 1.2 \cdot 10^{-1}$ liter²/mole²·sec from the slope. The same value for k_i was also found when oxidizing with a 53% O_2 + 47% N_2 mixture. Measurements at different partial pressures of O_2 and of n-decane - p-dichloro benzene mixtures of various compositions showed the chain formation reaction to be of first order with respect to the O_2 concentration, and of second order with respect to the decane concentration.

$k_i = 1.2 \cdot 10^{-1}$ liter²/mole²·sec

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Mechanism of chain ...

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B145/B138

$k_i = 5.2 \cdot 10^{-1}$ liter²/mole²·sec, i. e. a higher value, was established in the reaction in n-decane - p-dichloro benzene mixtures, evidently due to the polarity of the solvent. There are 3 figures and 7 references: 6 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: C. A. Mc Dowell, J. H. Thomas, J. Chem. Phys., 17, 558 (1949).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: December 11, 1961

Card 3/3

EMANUEL', N.M.; KONOVALOVA, N.P.; DRONOVA, L.M.

Kinetic characteristics of the antitumoral activity of chemical
compounds of various classes. Dokl. AN SSSR 143 no.3:737-740
Mr. '62. (MIRA 15:3)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-
korrespondent AN SSSR (for Emanuel'.)
(Cytotoxic drugs)

VARTANYAN, L.S.; EMANUEL', N.M.

Inactivation of lactic dehydrase by free radicals formed from
inhibitors of radical processes. Dokl. AN SSSR 143 no.5:1215-
1218 Ap '62. (MIRA 15:4)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Dehydrases) (Radicals (Chemistry))

SKIBIDA, I.P.; MAYZUS, Z.K.; EMANUEL', N.M.

Study of kinetic regularities of complex chain processes as a method for determining the rates of formation and consumption of intermediate products. Dokl. AN SSSR 144 no.1:170-172 My '62. (MIRA 15:5)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').
(Hydrocarbons) (Chemical reaction, Rate of) (Oxidation)

LIPSITS, D.V.; KRUGLYAKOVA, K.Ye.; POSTNIKOVA, M.S.; EMANUEL', N.M.

Suppression of the development of vegetable tumors (potato
canker) by inhibitors of radical processes. Dokl. AN SSSR 145
no.1:212-214 J1 '62. (MIRA 15:7)

1. Vsesoyuznaya nauchno-issledovatel'skaya stantsiya po raku
kartofelya Vsesoyuznogo instituta zashchity rasteniy i Institut
khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR
(for Emanuel').

(Potato wart)

(Gallic acid)

YURKOVA, I.B.; PAVLOVSKIY, Ye.N., akademik; TALYZIN, F.F.; EMANUEL', N.M.

Comparative characteristics of the detoxifying effect of propyl gallate on the venoms of snakes of the Viperidae family. Dokl. AN SSSR 146 no.4:975-976 O '62. (MIRA 15:11)

1. Moskovskiy meditsinskiy institut im. I.M. Sechenova, Zoologicheskii institut AN SSSR i Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').

(VENOM)

~~.....~~ (ACID)

KUKUSHKINA, G.V.; GORBACHEVA, L.B.; EMANUEL', N.M.

Kinetic characteristics of the inhibition of protein biosynthesis
in cancer cells treated with alkyl phenols and chloramphenicol. Dokl.
AN SSSR 146 no.5:1206-1208 0 '62. (MIRA 15:10)

1. Institut khimicheskoy fiziki AN SSSR. 2. ~~Chlen~~^{Ucheny}-korrespondent AN
SSSR (for Emanuel').
(CHLORAMPHENICOL—PHYSIOLOGICAL EFFECT) (PHENOLS—PHYSIOLOGICAL EFFECT)

KUKUSHKINA, G.V.; GORBACHEVA, L.B.; EMANUEL', N.M.

Differences in the nature of the suppression of protein biosynthesis in cancerous cells by oxyaromatic compounds and alkylating agents. Dokl. AN SSSR 147 no.5:1218-1219 D '62. (MIRA 16:2)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').
(PROTEINS) (BIOSYNTHESIS) (CANCER)

EMANUEL', Nikolay Markovich; FAYNBOYM, I.B., red.; RAKITIN, I.T.,
~~XXXXXXXXXXXXXXXXXXXX~~

[Chemistry and physics] Khimiia i fizika. Moskva, Izd-vo
"Znanie," 1963. 31 p. (Novoe v zhizni, nauke, tekhnike.
IX Seria: Fizika i khimiia; no.13) (MIRA 16:8)

1. Chlen-korrespondent AN SSSR (for Emanuel').
(Chemistry) (Physics)

ACCESSION NR: AT4010620

S/3051/63/000/000/0420/0427

AUTHOR: Emanuel', N. M.; Denisov, Ye. T.

TITLE: Stimulation and inhibition of the reaction of liquid-phase oxidation in the light of the chain theory

SOURCE: Kataliticheskiye reaktsii v zhidkoy faze. Trudy* Vsesoyuznoy konferentsii. Alma-Ata, 1963, 420-427

TOPIC TAGS: oxidation stimulation, oxidation inhibition, liquid phase oxidation, oxidation, chain theory, branched chain, free radical, chain reaction

ABSTRACT: The article discusses the Semenov theory (N. N. Semenov, Tsepry*ye reaktsii, L. Goskhimizdat, 1934) of chain reactions with a degenerated, branched chain. The latest concept of these chain reactions includes the following main points: 1) The formation of free radicals in an oxidation reaction is primarily due to the stimulation caused by hydroperoxides, although acids and ketones such as cyclohexanone may also play a role. 2) The formation of free radicals may also involve nonperoxide substances, as in the oxidation of methylethylketone which yields diacetyl; diacetyl rapidly decomposes to free radicals. 3) The low, initial rate of hydrocarbon oxidation may be increased by adding initiators such as peroxides, azo-compounds, and salts of metals with variable valences. Salts of metals

ACCESSION NR: AT4010620

however, may also act as inhibitors, as exemplified by KMnO_4 in the oxidation of n-decane. This inhibition suggests the existence of a Mn^{2+} critical concentration, which reverses the stimulation. 4) The oxidation of paraffin to fatty acids can be initiated by γ -radiation from a cobalt source. 5) Heterogeneous catalysts such as metallic oxides act as stimuli in reactions of liquid-phase oxidation, as exemplified by a MnO_2 catalyst in the oxidation of isobutylene. The article continues with a discussion of the critical factors in an inhibited reaction. The inhibitor concentration that effects a break in the chain and the use of inhibitors in studies of complex chain-nonchain reactions yielding free radicals are also mentioned. Orig. art. has: 40 chemical formulas and 4 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AN SSSR)

SUBMITTED: 00

DATE ACQ: 25Jan64

ENCL: 00

SUB CODE: GC, GP

NO REF SOV: C15

OTHER: 001

EMANUEL¹, N.M.

Role of free radicals in radiobiological processes and some new possibilities for developing means against radiation injury.¹
Trudy MOIP. Otd. biol. 7:73-83 '63. (MIRA 16:11)

BOGDANOV, G. N.; POSTNIKOVA, M. S.; EMANUEL', N. M.

Formation of phenoxy radicals during the oxidation of phenols
by lead tetraacetate. Izv. AN SSSR. Otd. khim. nauk no.1:
173-175 '63. (MIRA 16:1)

1. Institut khimicheskoy fiziki ANSSSR.

(Phenols) (Phenoxy group) (Lead acetates)

OBUKHOVA, L.K.; EMANUEL', N.M.

Role of ketones as intermediate products in the formation of acids
in liquid phase oxidation of hydrocarbons. Neftekhimiia 3 no.3:
367-370 My-Je '63. (MIRA 16:9)

1. Institut khimicheskoy fiziki AN SSSR.
(Ketones) (Acids) (Oxidation)

L 15482-63 EPF(e)/EWT(m)/BDS Pr-4 RM/WW
 A RESOLUTION NR: AP3005450 S/C204/63/003/004/0541/0547

AUTHORS: Blyumberg, E. A.; Maliyevskiy, A. D.; Emanuel', N. M.

TITLE: Effect of solvents upon the mechanism of the liquid phase
 oxidation of n-butane (

SOURCE: Neftekhimiya, v. 3, no. 4, 1963, 541-547

TOPIC TAGS: n-butane liquid phase oxidation, acetic acid, butane,
 chromatography, paper chromatography, gas-liquid chromatography,
 ethylacetate, liquid phase oxidation, n-butane

ABSTRACT: Authors studied the kinetics of oxidation of n-butane in
 pure form and in a mixture with acetic acid at a temperature of 1450
 and 50 atm. in order to determine whether or not the acetic acid
 affects the composition of oxidation products of n-butane. The
 analysis of the products was conducted by means of gas-liquid
 chromatography, paper chromatography, and ordinary chemical methods.
 It was found that acetic acid is not an inert solvent in liquid phase
 oxidation of n-butane. It shows a considerable effect on the mecha-

Card 1/2

. L 15482-63

ACCESSION NR: AP3005450

nism of reaction. When the oxidation of n-butane is carried out in media, the formation of methylethylketone, acetate is not as noticeable as in the case when it is in solutions or without solvents. The oxidation of pure n-butane is much faster than its oxidation in solutions with acetic acid. An assumption is made that the change of composition of products of butane in acetic acid is related to the decrease of the chain reaction of n-butylhydroperoxide, which results in the formation of methylethylketone. The use of benzol as a solvent has its limits. The solution attains a critical concentration of benzol at which the butane oxidation process is completely stopped. Fig. art. has: 1 table, and 4 figures.

ASSOCIATION: Institut khimicheskoy fiziki, AN SSSR (Institute of chemical physics, AN SSSR)

SUBMITTED: 17Aug62

DATE ACQ: 06Sep63

ENCL: 00

SUB CODE: CH

NO REF SOV: 011

OTHER: 000

Card 2/2

L 12717-63 EWP(j)/EPF(c)/EWT(1)/EWT(m)/BDS AFPTC/ASD Pc-4/Pr-4 WW/RM/JFW
 ACCESSION NR: AP3002301 S/0062/63/000/006/1143/1143

AUTHOR: Emanuel', N. M.; Kruglyakova, K. Ye.; Vichutinskiy, A. A.; Vasil'yev, R. F. 71

TITLE: Chemiluminescence of solutions of desoxyribonucleic acid (DRNA) after irradiation with x-rays

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1143

TOPIC TAGS: chemiluminescence, desoxyribonucleic acid (DRNA), x-rays, irradiation, peroxides, recombination of radicals

ABSTRACT: A low intensity chemiluminescence has been discovered following irradiation of DRNA solution. The intensity falls exponentially with time. It was shown chemically that the peroxides arising from irradiation of DRNA decompose according to the same law at approximately the same rate. The chemiluminescence may arise from recombination of radicals formed from peroxides produced in the irradiation.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences SSSR)

SUBMITTED: 25 Feb 63
 SUB CODE : 00
 Card 1/1

DATE ACQ: 16 Jul 63
 NO REF SOV: 004

ENCL: 00
 OTHER: 000

44561
S/020/63/148/001/020/032
B144/B186

212400
5:1140
AUTHORS:

Vartanyan, L. S., Strigun, L. M., Emanuel', N. M.,
Corresponding Member AS USSR

TITLE: Kinetics of propylgallate autooxidation in aqueous solution

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 1, 1963, 97-100

TEXT: The course of the oxidation of propyl gallate (PG) which has an antitumor and radiation-protective effect was determined polarographically in a borate buffer of pH 7.2 - 7.4 at a constant temperature of 21°C. Consistently with data published on PG in acetate buffer, the half-wave potential depended linearly on the pH of the medium within the pH range 7.1 - 8.6. The PG oxidation rate increased with increasing pH and showed a linear dependence on the OH⁻ ion concentration, which indicates that PG ions with a single charge react. The reaction is first-order with respect to the initial PG concentration. Moreover a zero-order reaction with respect to the process concentration was found, which may be explained by intermediate formation of quinone. This is converted with an increasing rate to semiquinone by reacting with PG. The temperature

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Kinetics of propylgallate ...

S/020/63/148/001/020/032
B144/B186

dependence of the oxidation rate was studied at pH 7.6 and 8.8. The activation energy derived from these data was 18000 ± 700 cal/mole and is attributed to the ionized semiquinone molecule. A steep wave with a half-wave potential of 1.17 v was detected polarographically in the PG oxidate (buffer pH 7.2). By separate tests it was proved that this wave is due to the presence of H_2O_2 , and this was identified also by the qualitative reaction with $(TiO_2 + H_2SO_4)$. The presence of further oxidation products resulted from the 0.03 v difference between the half-wave potentials of H_2O_2 and the PG oxidate. A complete scheme of PG oxidation in aqueous solution is given. The formation of free-radical intermediate products may explain the different behavior of phenol inhibitors in biological experiments. There are 4 figures. ✓

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: August 10, 1962

Card 2/2

SAPEZHINSKIY, I.I.; POSTNIKOVA, M.S.; EMANUEL', N.M.

Interaction between the radicals of irradiated protein and alkyl phenols. Dokl. AN SSSR 148 no.5:1207-1209 F '63. (MIRA 16:3)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').
(Phenols) (Proteins) (Radiation--Physiological effect)

PELEVINA, I.I.; ANDREYEV, V.M.; LIPCHINA, L.P.; EMANUEL', N.M.

Kinetic characteristics of the activity suppression in enzymes of
the succinic oxidase system by the inhibitors of radical processes.
Dokl. AN SSSR 148 no.6:1408-1411 F '63. (MIRA 16:3)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

(Enzymes) (Inhibition (Chemistry))

SKIBIDA, I.P.; MAYZUS, Z.K.; EMANUEL', N.M.

Activation energy of the chain reactions by which
alcohols are formed and consumed in the oxidation of
n-decane. Dokl. AN SSSR 149 no.5:1111-1114 Ap '63. (MIRA 16:5)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Decane) (Alcohols) (Chemical reaction, Rate of)

AGATOVA, A.I.; VARTANYAN, L.S.; EMANUEL¹, N.M.

Mechanism by which free radicals formed from inhibitors of radical processes interact with the SH groups of proteins.
Dokl. AN SSSR 150 no.3:547-550 My '63. (MIRA 16:6)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel¹).
(Proteins) (Thiols) (Radicals(Chemistry))

L 12631-63

EPR/EWP(j)/EPF(o)/EWT(n)/BDS

Ps-L/Pc-L/Pr-L

EM/EM

ACCESSION NR: AP3002877

S/0020/63/150/O 5/1066/1068 7/

AUTHOR: Blyumberg, E. A.; Bulygin, M. G.; Margolis, L. Ya.; Emanuel', N. M. 7/

TITLE: Liquid phase oxidation of isobutylene in the presence of heterogeneous catalysts

SOURCE: AN SSSR. Doklady*, v. 150, no. 5, 1963, 1066-1068

TOPIC TAGS: liquid phase oxidation, isobutylene, heterogeneous catalyst, salt catalyst, hydrocarbon gas oxidation, gaseous phase oxidation

ABSTRACT: The object of this work is to increase the selectivity of the oxidation processes in the liquid phase of hydrocarbon gases by means of utilization of heterogeneous catalysts. An assumption was made that the oxidation of hydrocarbons in the liquid phase does not have a principal difference between the analogous oxidation in the gaseous phase. The experimental product for the oxidation in this study was 99.8% pure isobutylene with an admixture of 0.1% by weight of butylene and 0.1% of saturated C sub 3 - C sub 4 hydrocarbons. The process of oxidation of isobutylene in the absence of catalysts did not take place even after 12 hours following the introduction of oxygen. With the introduction of any of

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L 12631-63

ACCESSION NR: AP3002877

the salt catalysts such as MnO sub 2, Cr sub 2 O sub 3, CuCr sub 2 O sub 4, MnCr sub 4, V sub 2 O sub 5, CuO, MnCoO sub 4 and Pt on SiO sub 2, the oxidation of isobutylene takes place practically without the formation of oxygen-containing products. The products are acetone and formaldehyde. The selectivity of these heterogeneous catalysts is low. These catalysts are only initiators of the oxidation process of isobutylene and do not possess any selectivity of the reaction. Orig. art. has: 1 table and 2 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences SSSR)

SUBMITTED: 20Mar63

DATE ACQ: 15Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 007

OTHER: 002

mcs/sa

Card 2/2

ELYUMBERG, E.A.; NORIKOV, Yu.D.; EMANUEL', N.M.

Role of the surface in the chain propagation reaction in the
liquid phase oxidation of n-butane. Dokl. AN SSSR 151 no.5:
1127-1130 Ag '63. (MIRA 16:9)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Butane) (Oxidation) (Chemical reactors)

SAPEZHINSKIY, I.I.; SILAYEV, Yu.V.; EMANUEL', N.M.

Reaction of radicals from irradiated protein and polymethyl
methacrylate with oxygen and alkyl phenols. Dokl. AN SSSR 151
no.3:584-586 J1 '63. (MIRA 16:9)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').
(Radicals (Chemistry)) (Proteins--Spectra) (Radiation)

I 19014-63

EPF(c)/EWP(j)/EWT(m)/BDS Pr-4/Pc-4 RM/WW/JW/MAY

ACCESSION NR: AP3007235

S/0020/63/152/001/0110/0113

AUTHOR: Karpukhina, G. V.; Mayzus, Z. K.; Emanuel', N. M.
(Corresponding member, AN SSSR)

72
68

TITLE: Interaction of two inhibitors in hydrocarbon oxidation

SOURCE: AN SSSR. Doklady*, v. 152, no. 1, 1963, 110-113

TOPIC TAGS: antioxidant, oxidation inhibitor, inhibitor, oxidation, hydrocarbon oxidation, hydrocarbon, synergism, synergistic effect, synergistic inhibitor, Neozone D, 2-naphthylamine. N-phenyl-, phenol. 2,6-di-tert-butyl-, benzene. ethyl-, isobutyronitrile. azodi-, Ionol, p-cresol. 2,6-di-tert-butyl-, phenolphthalein. tetraisopropyl-, diphenylamine, inhibitor consumption, consumption rate, free radical, hydrazine. tetraphenyl-

ABSTRACT: The consumption rate of two inhibitors (antioxidants) of the phenol and aromatic amine type in hydrocarbon oxidation has been studied to clarify the mechanism of the synergistic effect of two inhibitors used simultaneously. Neozone D (N-phenyl-2-naphthylamine) and 2,6-di-tert-butylphenol (I) were used both separately and simultaneously in ethylbenzene oxidation initiated with

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L 19014-63

ACCESSION NR: AP3007235

2

azobisisobutyronitrile and conducted at 70C. This oxidation has the advantage of being an "unbranched" chain reaction. Changes in inhibitor concentration in the course of oxidation were determined spectrophotometrically by formation of an azo dye from the inhibitor and added diazotized p-nitroaniline. It was found that a single inhibitor is spent at a rate equal to one-half the initiation rate, indicating that one inhibitor molecule reacts with two RO_2 free radicals. When the two inhibitors are used together, consumption of Neozone D is slight until practically all of the phenol I is spent. Neozone D is subsequently consumed at a rate close to the half-rate. This amine-consumption inhibition is observed at various ratios and total contents of the two inhibitors. The same inhibition was observed with other pairs of phenols and amines; e.g., Neozone D with 2,6-di-tert-butyl-4-methylphenol (Ionol) or with tetraisopropylphenolphthalein. Replacement of Neozone D with another amine, diphenylamine, also resulted in considerable slowing of amine consumption in the presence of the phenol. In an attempt to explain this phenomenon, the rate constants of the reaction between inhibitor and RO_2 free radicals

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ACCESSION NR: AP3007235

were determined by the chemiluminescence quenching method (O. N. Karpukhin, V. Ya. Shlyapintokh, N. V. Zolotova, Izv. AN SSSR, OKhN, 1963, No. 10). It was clearly indicated that inhibition of amine consumption in the presence of phenols is not caused by the difference in the values of the constants, i.e., in the effectiveness of the inhibitor. It is assumed that a free radical formed by the reaction of the amine with RO_2 radicals abstracts a hydrogen atom from the phenol, thus restoring the amine. Hence, amine concentration changes only slightly until all of the phenol is consumed. This assumption was confirmed experimentally by establishing that diphenylamine accumulates during ethylbenzene oxidation inhibited by Ionol and tetraphenylhydrazine. The latter is a source of $(C_6H_5)_2\dot{N}$ radicals which form diphenylamine on reacting with Ionol (by abstracting an H atom from this phenol). Oxidation of the $R_1R_2\dot{N}$ free radicals does not occur, since the reaction rate with Ionol is higher than the $R_1R_2\dot{N}$ oxidation rate. The results of the study may also contribute to an understanding of the synergistic effect of inhibitor pairs at higher temperatures. Orig. art. has: 4 figures and 1 table.

ASSN: Institute of Chemical Physics, Academy of Sciences, USSR
Card 3/83

EMANUEL', N.M.; DRONOVA, L.M.; KONOVALOVA, N.P.; MAYZUS, Z.K.;
~~SKIBIDA, I.P.~~

Antileukemic effect of 2,6-di-tert.-butyl-4-methylphenol
(ionol). Dokl. AN SSSR 152 no.2:481-484 S '63. (MIRA 16:11)

X

AGATOVA, A.I.; EMANUEL', N.M.

Change in the structure and activity of aldolase under the
action of propyl gallate. Dokl. AN SSSR 153 no.1:204-206
N '63. (MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespon-
dent AN SSSR (for Emanuel').

FRANKFURT, O.S.; LIPCHINA, L.P.; EMANUEL', N.M.

Effect of inhibitors-antioxidants (phenols) on the life
cycle of Ehrlich's ascites carcinoma cells. Dokl. AN SSSR
153 no.3:699-702 N '63. (MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

*

ACCESSION NR: AP4024407

S/0204/64/004/001/0082/0090

AUTHOR: Skibida, I. P.; Maysus, Z. K.; Emanuel', N. M.

TITLE: Reactivity of intermediate materials in hydrocarbon oxidation reactions.

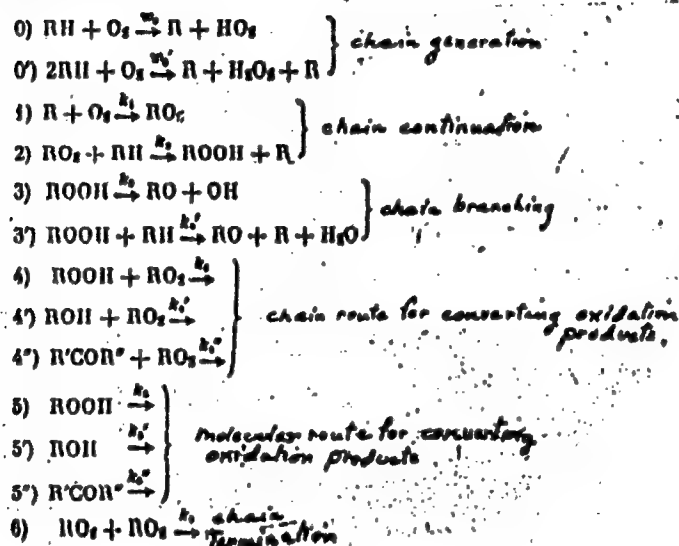
SOURCE: Neftekhimiya, v. 4, no. 1, 1964, 82-90

TOPIC TAGS: hydrocarbon oxidation, reaction rate, hydroperoxide, alcohol, ketone, RO sub 2 radical, ethylbenzene oxidation, decane oxidation, kinetics, acetophenone, methylphenylcarbinol, reactivity

ABSTRACT: The rates of reaction of hydroperoxides, alcohols and ketones with RO₂ radicals in the oxidation of ethylbenzene and n-decane were determined by a method developed by the authors (Uspekhi khimii 26, 416, 1957) wherein the rates of formation and consumption of reaction products in an open system may be determined. The various parallel and consecutive reactions by which the chain oxidation of hydrocarbons may proceed were investigated and the reaction rates determined.

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ACCESSION NR: AP4024407



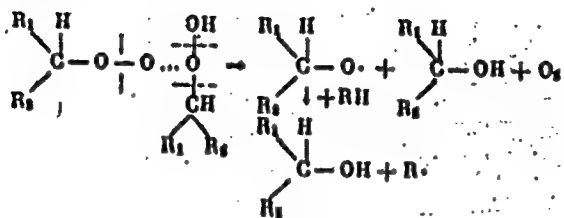
Card 2/8

ACCESSION NR: 4024407

The kinetic curves of ethylbenzene consumption and hydroperoxide accumulation (fig. 1) and alcohol (methylphenylcarbinol), hydroperoxide and ketone (acetophenone) accumulations (figs. 2 and 3) for reactions run at 118 C were drawn. Acetophenone is the end product of ethylbenzene oxidation; its rate of consumption $k_4''(RO_2) = 0$, $k_5 = 0$, and $k_3 = 0.82 \times 10^{-3}$ mol/l.hr. The reactivity of ethylbenzene and its oxidation products with RO_2 increases in the series ethylbenzene ($k_2 = 8.3 \times 10^{-3}$ hrs⁻¹), alpha-hydroperoxide ($k_4 = 7.8 \times 10^{-2}$ hrs⁻¹), and methylphenylcarbinol ($k_4' = 10.2 \times 10^{-2}$); the relative reactivities are 1:9.5:12. $k_6 = 7.8 \times 10^{10}$ l/mol.hr. The rate constants of the elementary reactions were determined: $k_2 = 1.3 \times 10^1$, $k_4 = 1.2 \times 10^4$ and $k_4' = 1.6 \times 10^2$ l/mol.sec. The reactivity of n-decane, its hydroperoxide and its isomeric alcohols formed by oxidation at 140 C was determined (fig. 4). The rate of reaction with RO_2 radicals for all the isomers is the same. $k_2(RO_2) = 3.8 \times 10^{-4}$ min⁻¹; $k_4(RO_2) = 2.6 \times 10^{-3}$; $k_4'(RO_2) = 0.51 \times 10^{-2}$; hence the rate of reaction of RO_2 increases in the order n-decene, alcohols, hydroperoxide in the ratio of 1:6.3:13. As with ethylbenzene, the reactivity of n-decane with the RO_2 radical is less than with their respective hydroperoxides or alcohols. Unlike ethylbenzene, the reactivity with the decyl alcohols is two times less than with the hydroperoxide, leading to the formation of different products, in this case alcohols:

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ACCESSION NR: AP4024407



Orig. art. has: 21 equations and 6 figures.

ASSOCIATION: Institut khimicheskoy fiziki, AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 26Jul63

DATE ACQ: 17Apr64

BNCL: 04

SUB CODE: GC

NO REF SOV: 007

OTHER: 001

Card 4/8

ACCESSION NR.: AP4024407

ENCLOSURE: 01

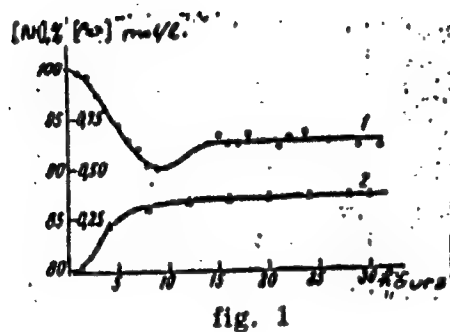


fig. 1
Kinetic curves of the consumption of hydrocarbon (curve 1, external scale) and accumulation of hydroperoxide (curve 2, internal scale). Ethylbenzene oxidized in open system $v/V = 0.102 \text{ hr}^{-1}$, 118° .

Card 5/8

ACCESSION NR: AP4024407

ENCLOSURE: 02.

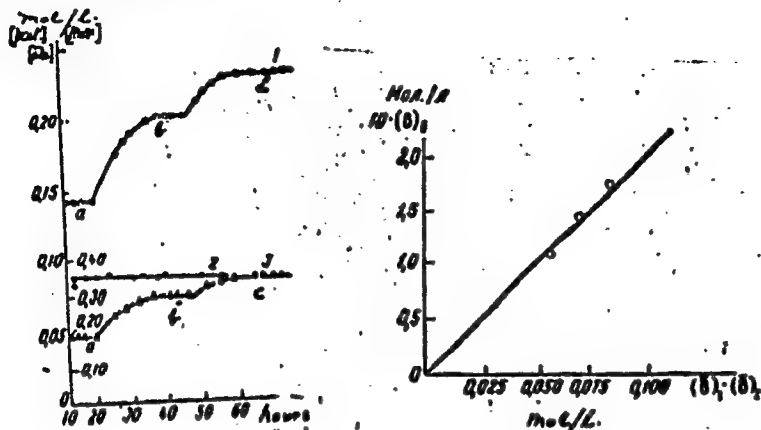


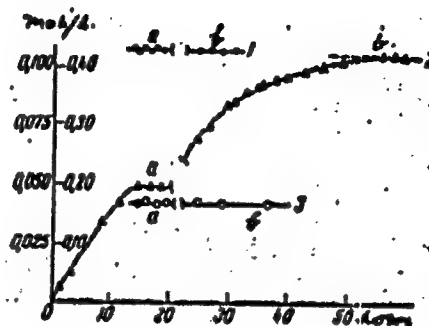
fig. 2

Kinetic curves for the accumulation of alcohol (1), hydroperoxide (2) and ketone (3). Ethylbenzene oxidation in open system with ethylbenzene feed (part a) and feed of methylphenylcarbinol solution in ethylbenzene, containing 0.106 mol/l alcohol (part b) and 0.17 mol. /l. alcohol (part c). $v/V = 0.102 \text{ hr}^{-1}$, 118° .
Card 6/8.

ACCESSION NR: AP4024407

ENCLOSURE: 03

Fig. 3. Kinetic curves for the accumulation of hydroperoxide, ketone and alcohol. Oxidation of ethylbenzene in open system with ethylbenzene feed (curves 1a, 2a, 3a) and feed of ethylbenzene containing 0.055 mol/l. acetophenone (curves 1b, 2b, 3b), 1--hydroperoxide (internal scale); 2--acetophenone; 3--methylphenylcarbinol. $v/V = 0.102 \text{ hr}^{-1}$.

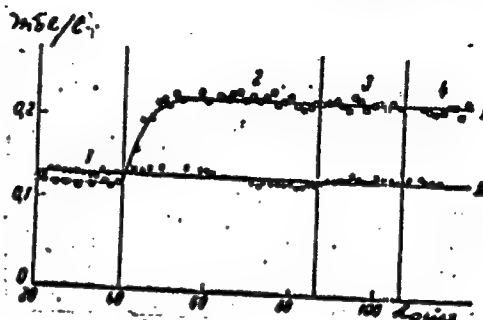


Card 7/8

ACCESSION NR: AP4024407

ENCLOSURE: 04

Fig. 4. Stationary concentration of alcohols (I) and hydroperoxide (II) in oxidizing n-decane in open system; $v/V = 2.7 \times 10^{-3} \text{ min}^{-1}$, 140° . Section 1--pure n-decane feed; 2--mixture of n-decane with decanol-2; in amount of 0.205 mol/l.; 3--mixture of n-decane with the same amount of decanol-4; 4--mixture of n-decane with decanol-5.



Card 8/8

ZAIKOV, G. Ye.; MAYZUS, Z.K.; EMANUEL, N.M.

Initiation of chains in the liquid-phase oxidation of methyl
ethyl ketone and ethyl alcohol. Neftekhimiia 4 no.1:91-95'64
(NIRA 17:6)

1. Institut khimicheskoy fiziki AN SSSR.

MALIYEVSKIY, A.D.; BLYUMBERG, E.A.; EMANUEL', N.M.

Critical phenomenon in the liquid-phase oxidation of a methyl-ethyl ketone in a benzene solution. *Neftekhim* 4 no.3:472-476
My-Je '64. (MIRA 18:2)

1. Institut khimicheskoy fiziki AN SSSR.

EMANUEL', N.M.

New problems in the field of chemical chain reactions.
Vest. AN SSSR 34 no.5:65-78 My '64. (MIRA 17:6)

1. Chlen-korrespondent AN SSSR.

VARTANYAN, L.S.; GONIKBERG, E.M.; EMANUEL', N.M.

Effect of propyl gallate on the kinetic constants of the
enzymatic reduction reaction of sodium pyruvate. Dokl. AN
SSSR 154 no.1:223-225 Ja'64. (MIRA 17:2)

1. Chlen-korrespondent AN SSSR (for Emanuel').

ZEYNALOV, B.K., doktor khim. nauk, prof.; EMANUEL', N.M., red.

[Oxidation of paraffin distillates and ways for the practical utilization of the oxidation products] Okislenie parafinistogo distilliata i puti prakticheskogo ispol'zovaniia produktov okisleniia. Baku, Azerneshr, 1964. 255 p. (MIRA 18:2)

1. Chlen-korrespondent AN SSSR (for Emanuel').

EMANUEL', N.M.; DRONOVA, I.M.; GAGARINA, A.B.; KONOVALOVA, N.P.

Critical phenomena in transplantable leucosis. Dokl. AN SSSR 155
no.1:220-223 Mr '64. (MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

"APPROVED FOR RELEASE: Thursday, July 27, 2000

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APPROVED FOR RELEASE: Thursday, July 27, 2000

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APL034040

Page 7/3

KONOVALOVA, N.P.; BOGDANOV, G.N.; MILLER, V.B.; NEYMAN, M.B.;
ROZANTSEV, E.G.; EMANUEL', N.M.

Antitumorigenic activity of stable free radicals. Dokl. AN
SSSR 157 no.3:707-709 J1 '64. (MIRA 17=7)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

VARTANYAN, L.S.; GONIKBERG, E.M.; EMANUEL', N.M.

Kinetics of inactivation of lactic dehydrogenase with radical
products of propyl gallate autoxidation. Izv. AN SSSR. Ser.
khim. no.10:1742-1748 O '64. (MIRA 17:12)

1. Institut khimicheskoy fiziki AN SSSR.

ZHIZHINA, G.P.; ZYBINA, D.L.; KRUGLYAKOVA, K.Ye.; EMANUEL', N.M.

Kinetic characteristics of the degradation of peroxide compounds
in irradiated DNA solutions. Dokl. AN SSSR 158 no.4:935-938 O '64.
(MIRA 17:11)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

SAPEZHINSKIY, I.I.; SILAYEV, Yu.V.; EMANUEL', N.M.

Long afterglow in aqueous solutions of proteins and synthetic
polymers irradiated by X rays. Dokl. AN SSSR 159 no.6:1378-1380
D '64. (NIRA 18:1)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

EMANUEL', Nikolay Markovich; DENISOV, Ievgeniy Timofeyevich;
MAYZUS, Zinaida Kushalevna. Prinimali uchastie:
ANTONOVSKIY, V.L.; BLYUMBERG, E.A.; VASIL'YEV, R.F.;
GAGARINA, A.B.; GOL'DBERG, V.M.; ZAIKOV, G.Ye.; DORIKOV,
Yu.D.; OBUKHOVA, L.K.; TSEPALOV, V.F.; SHLYAPINTOKH,
V.Ya.; SKIBIDA, I.P., red.

[Oxidation chain reactions of hydrocarbons in the liquid
phase] Tsepnye reaktsii okisleniya uglevodorodov v
zhidkoi faze. Moskva, Nauka, 1965. 374 p. (MIRA 18:8)

SAPEZHINSKIY, I.I.; SILAYEV, Yu.V.; EMANUEL', N.M.

Studying the recombination of free radicals of irradiated protein
and polymethylmethacrylic acid by the electron paramagnetic
resonance and chemiluminescent method. Trudy MOIP. Ctd. Biol.
21:102-106 '65. (MIRA 18:6)

EMANUEL', N.M.; KRUGLYAKOVA, K.Ye.; ZHIZHINA, G.P.; VICHUTINSKIY, A.A.;
VASIL'YEV, R.F.

Chemiluminescence of DNA solutions following X-ray irradiation.
Trudy MOIP. Otd. biol. 21:119-121 '65. (MIRA 18:6)

SAPEZHINSKIY, I.I.; EMANUEL', N.M.

Effect of some radioprotective substances on the afterglow
of serum albumin solutions. Trudy MOLF. Otd. Biol. Fiz.
122-124 '65. (MIRA 18:6)

ANDRONOV, L.M.; MAYZUS, Z.K.; EMANUEL', N.M.

Kinetics of oxidation of aqueous solutions of glyceraldehyde
by molecular oxygen. Izv. AN SSSR. Ser. khim. no.9:1519-
1523 '65. (MIRA 18:9)

1. Institut khimicheskoy fiziki AN SSSR.

EMANUEL', N.M.

Perspectives in the kinetic studies on biochemical processes in effective chemotherapy of cancer. Vest. AMN SSSR 20 no.8:86-94 '65. (MIRA 18:9)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

KARGIN, V.A., akademik; EMANUEL', N.M.

Some trends of chemical research in the United States. Vest. AN
SSSR 35 no.10:86-95 0 '65. (MIRA 13:10)

1. Chlen korrespondent AN SSSR (for Emanuel').

KAPLUN, N.A.; DRONOVA, L.M.; BELICH, Ye.M.; EMANUEL', N.M., prof.

Effect of direct current on the development of transplantable leukemia in mice. Biul. eksp. biol. i med. 60 no.7:102-104 J1 '65.
(MIRA 18:8)

1. Otdel khimicheskikh i biologicheskikh protsessov (zav.-chlen korrespondent AN SSSR prof. N.M. Emanuel') Instituta khimicheskoy fiziki (direktor - akad. N.N. Semenov) AN SSSR i otdel bal'neofizioterapii (zav.-chlen-korrespondent AMN SSSR prof. A.N. Obrosoy) Tsentral'nogo nauchno-issledovatel'skogo institut kurortologii i fizioterapii (direktor - kand. med. nauk G.N. Pospelova) Ministerstva z.ravookhraneniya SSSR, Moskva.

EMANUEL', N.M.; KONOVALOVA, N.P.; BOGDANOV, G.N.; VASIL'YEVA, L.S.

Kinetics of the development of ascitic leukemia L-1210. Dokl.
AN SSSR 160 no.6:1421-1423 F '65.

(MIRA 18:2)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Emanuel').

KRUGLYAKOVA, K.Ye.; ULANOV, B.P.; ZYBINA, D.L.; EMANUEL', N.M.

Kinetic characteristics of the effect of chemical mutagens (ethyl-
enimine derivatives) on DNA. Dokl. AN SSSR 161 no.3:718-720 Mr '65.
(MIRA 18:3)

1. Chlen-korrespondent AN SSSR (for Emanuel').

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EMANUEL', N.M.; VERMEL', Ye.M.; RAPOPORT, I.A.; KRUGLYAK, S.A.; DRONOVA, L.M.;
OSTROVSKAYA, L.A.

Antisoplastic properties of powerful chemical mutagens (nitrosourea
derivatives). Dokl. AN SSSR 163 no.2:483-485 J1 '65. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN
SSSR (for Emanuel').

SEMENOVA, L.I.; NIKOL'SKAYA, T.A.; EMANUEL', N.M.

Suppression of oxidation phosphorylation and respiration in liver mitochondria and solid hematoma of mice by propyl gallate. Dokl. AN SSSR 163 no.3:774-776 J1 '65. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').

ZHIZHINA, G.P.; KRUGLYAKOVA, K.Ye.; EMANUEL', N.M.

Nature of superweak glow of irradiated solutions of deoxyribonucleic acid. Dokl. AN SSSR 163 no.4:931-934 Ag '65.

(MIRA 18:8)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Emanuel').

L 2674-66 ENT(m)

ACCESSION NR: AP5021291

UR/0020/65/163/005/1278/1281

AUTHOR: Burlakova, Ye. B.; Dzyuba, N. M.; Pal'mina, N. P.; Emanuel',
N. M. (Corresponding member AN SSSR)

TITLE: Antioxidant activity of mouse liver lipids in ¹⁷radiation
sickness and leukosis and the effect of free radical reaction
inhibitors

SOURCE: AN SSSR. Doklady, v. 163, no. 5, 1965, 1278-1281

TOPIC TAGS: experiment animal, radiation sickness, radioprotective
agent, liver, chemotherapy, oxidation inhibition, neoplasm

ABSTRACT: Based on the assumption that synthetic inhibitors might be
effective in processes accompanied by changes in natural antioxidant
activity, the antioxidant activity changes of liver lipids were
studied after single or repeated administration of free radical
reaction inhibitors to intact animals. Mice were injected intraperi-
toneally with the inhibitors dissolved in water or a 10% Tween-80
solution. The natural antioxidants were extracted from the lipid
fraction of the animal livers and dissolved in methylolate, which

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ACCESSION NR: AP5021291

was then oxidized in an air current at 36 C in an oxidizing chamber. The kinetics of antioxidant activity changes of lipid extracts following single introduction of 4-methyl-2,6-di-tert-butylphenol is graphed. It was observed that a single administration increased the antioxidant activity while repeated administrations depressed this activity for some time depending on dose. It may be thus assumed that synthetic inhibitors resemble natural ones. Repeating this experiment with mice which had received a lethal radiation dose and whose antioxidant activity had declined to zero, it was found that with a 30 mg/kg dose of the above compound the activity level was maintained and 20-25% of the mice survived, while a 100 mg/kg dose had no such effect. Since cancer cells are known to differ from normal cells by the amount of antioxidants, tests were conducted in mice with leukosis who received the inhibitor 4-oxy-3,5-di-tert-butyl-alpha-methylbenzamine, which depressed and lengthened the initial activity of liver lipids. In animals irradiated prior to leukosis, the activity developed at a slower pace the higher the dose, resulting in increased survival times of up to 2 days. Similar results were obtained for animals whose antioxidant activity was depressed by administering large amounts of the inhibitor. It may thus be

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ACCESSION NR: AP5021291

concluded that small inhibitor amounts which cannot decrease the antioxidant activity of liver lipids in the intact animal display a radioprotective effect and favor the development of transplanted cancer, while large amounts which can decrease this activity will aggravate radiation sickness but slow down leukosis development. Orig. art. has: 3 figures.

ASSOCIATION: None.

SUBMITTED: 02Apr65

ENCL: 00

SUB CODE: LS

NR REF SOV: 009

OTHER: 002

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BULGAROV, Y.G.; GAIKSEVA, V.D.; SLEPOKHINA, I.V.; KHRAPOVA, N.G.; EMANUEL',
E.M.

Relation between the radioprotective and antitumor effects
of inhibitor-antioxidants. Dokl. AN SSSR 164 no.4:934-936 0
'65. (MIRA 18:10)

1. (in co-correspondent AN SSSR (for Emanuel')).

MAYZUS, Z.K.; SKIBIDA, I.P.; ~~EMANUEL'~~, N.M.

Mechanism of the catalytic decomposition of hydroperoxides
under the effect of copper stearate. Dokl. AN SSSR 164
no.2:374-377 S '65. (MIRA 18:9)

1. Chlen-korrespondent AN SSSR (for Emanuel').

EMANUEL', N.M.; ANDREYEV, W.M.; YEVSEYENKO, L.S.; KORMAN, D.B.;
OBUKHOVA, L.K.

Kinetic criterion of the effectiveness of stomach cancer
treatment in man. Dokl. AN SSSR 165 no.2:461-464 N '65.
(MIRA 18:11)

1. Chlen-korrespondent AN SSSR (for Emanuel').

L 11623-66 EWT(m)/EMP(j) DIAAP/RPL RM
ACC NR: AP6001730 SOURCE CODE: UR/0020/65/165/004/0845/0847
AUTHOR: ^{44,55} Sapezhinskiy, I. I.; Emanuel', N. M. (Corresponding Member ⁵⁸
AN SSSR) ^B
ORG: ^{44,55} Institute of Chemical Physics of the Academy of Sciences SSSR
(Institut khimicheskoy fiziki Akademii nauk SSSR)
TITLE: ¹⁹ Mechanism of irradiated protein radical recombination in the
presence of oxygen
SOURCE: AN SSSR. Doklady, v. 165, no. 4, 1965, 845-847
TOPIC TAGS: protein, gamma irradiation, oxidative reduction reaction,
reaction mechanism, free radical, microwave spectroscopy
ABSTRACT: ⁷ Oxygen consumption of irradiated proteins and loss of
radicals were investigated in casein and bovine serum albumin to test
the hypothesis that irradiated protein radical recombination takes
place according to an oxidative recombination chain reaction. The
initial number of radicals and the kinetics of their loss were
measured by an EPR-2 1KhF microwave spectrometer. Oxygen consumption
was measured by a capillary microrespirator. Measurements were made
over a 24-hr period to determine total oxygen consumption and radical
losses. The proteins were gamma-irradiated (GUT-60-400, 20 to 50 Mrads)
Card 1/3 UDC: 541.515/547.962 ⁷

L 11623-66

ACC NR: AP6001730

doses) in a sealed microrespirator. A figure shows typical curves for oxygen consumption and radical losses in irradiated casein and bovine serum albumin (see Fig. 1). The values for oxygen consumption and radical losses are for 1 g of protein. It is evident that with the entry of oxygen into the system, the number of radicals is reduced and oxygen is consumed. The rates of these processes are highest at the beginning and gradually decrease. Total time for radical losses and oxygen consumption was 15 to 20 hr, with the quantity of oxygen consumed greater than the number of radicals recombined during the same period. On the basis of these data "chain length" may be calculated. The present data indicate that irradiated protein radical recombination in the presence of oxygen can take place according to an oxidative recombination chain mechanism, but further quantitative research on yield of peroxides, carbonyl groups, and hydroxy groups for a radical of irradiated protein is necessary to prove the hypothesis conclusively. Orig. art. has: 1 figure.

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L 11623-66

ACC NR: AP6001730

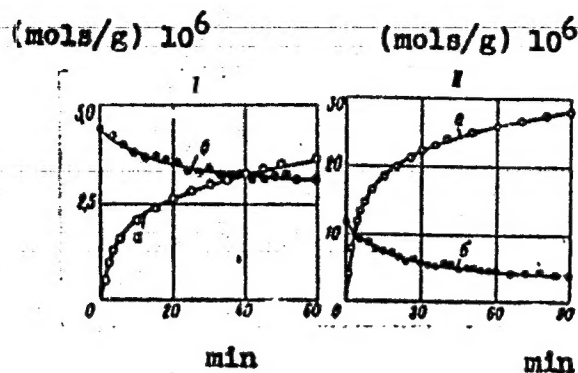


Fig. 1. Kinetic curves of oxygen consumption (a) and radical losses (b) of irradiated casein (I) and bovine serum albumin (II). [06]

SUB CODE: 06, 07/ SUBM DATE: 14Jun65/ ORIG REF: 006/ DTH REF: 006

ATD PRESS: 4/77

lch
Card 3/3

SADOVNIKOVA, I.P.; YEROKHIN, V.N.; KRUGLYAK, S.A.; VERTEL', Ye.M.;
EMANUEL', N.M.

Use of kinetic parameters in the evaluation of the
antineoplastic activity of chemical compounds in an
experiment. Vop.onk. 11 no.11:63-68 '65.

(MIRA 19:1)

1. Iz otdela khimicheskikh i biologicheskikh protsessov (zav. -
chlen-korrespondent AN SSSR N.M.Emanuel') Instituta khimicheskoy
fiziki AN SSSR (direktor - akademik N.N.Semenov).

L 17997-66 EWT(m)/EWP(j)/T WN/JW/NE/RM

ACC NR: AP6008090

SOURCE CODE: UR/0076/66/040/002/0322/0327

AUTHOR: Mayzus, Z. K.; Skibida, I. P.; Emanuel', N. M. 42
B

ORG: Institute of Chemical Physics, Academy of Sciences SSSR (Institut khimicheskoy fiziki Akademii nauk SSSR) 11

TITLE: The mechanism of the catalytic action of copper stearate on the oxidation of n-decane 11
14455

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 2, 1966, 322-327

TOPIC TAGS: liquid fuel, hydrocarbon oxidation, catalytic oxidation, reaction mechanism

ABSTRACT: Soluble copper salts are notably good oxidation catalysts. Previous work indicates that the catalytic effect consists of an acceleration of hydroperoxide decomposition into free radicals. Free radicals are formed on decomposition of the complex formed between the copper salt and the hydroperoxide. The structure of the complex and its rates of formation and decomposition are not known. The purpose of this work was the study of the catalytic effect of copper stearate on the oxidation of n-decane. The oxidation was conducted in a glass vessel at 140C, with an oxygen feed rate of 1.6 liters/hour. It was found that in the system n-decyl hydroperoxide-copper stearate, free radicals are formed as a result of the decomposition of the intermediate complex $[CuSt_2 \cdot nROOH]$. From the kinetic data it was possible to

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UDC: 541.124/128+541.12 2